

Business Model for Sustainable Development: An Insight from Malaysian Automotive Industry

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Abstract—In the modern economy, doing business is a challenging task to overcome volatile competition from established firms in the local and global market. In order to attain sustainability, firms are advised to be ahead from the competitors in term of business model or in its management. In general, the Malaysian automotive industry performance is on a par with Thailand and holds the top three positions in the ASEAN car market due to the strong dominance of the domestic market. However, in the new millennia, the competition is no longer between the companies but about achieving economy, ecology and social sustainability. Thus, to stay competitive, the strategy shifted from profit orientation to the sustainable development. Therefore, this research aimed to provide empirical evidence about the critical success factors towards the achievement of company sustainability. This study employed a quantitative research methodology and 242 returned questionnaires were then analysed via Co variance-based SEM (CB-SEM). The outcome of this research emphasizes that technology collaboration, green human resource, eco culture and eco product innovation are important factors to meet the sustainability of Malaysian automotive industry, especially in economy, ecology and social development. This research is meaningful to attain the world wide and nation strategy to “Go Green.

Keywords—*Sustainable Development, Eco Product Innovation, Technology Collaboration, Green human and Malaysia*

I. INTRODUCTION

Sustainability is crucial in the 21st century since the ultimate goals of any corporation for the global competition is serving the human basic needs and giving earth protection, especially in the growth of sustainable initiatives in the firms’ activities and the strategies in the manufacturing industry. The spurt growth of global competition in sustainability development has forced Malaysian manufacturer to change their business strategy towards green manufacturing strategy [1]. Therefore, the new trends of sustainability development resulted in growing research attention on the constructs of high impact on the success of triple helix development.

The objective of this research is to shed light on the new business model for sustainable development from the Southeast Asia point of view. The outcomes of this research is beneficial as a guideline for another country in this region and refill the academic gap in the areas of sustainable development.

II. LITERATURE REVIEW

Sustainability is crucial in the 21st century since the ultimate goals of any cooperation for the global competition is to serve human need and for environmental conversation, In turn, it

stimulates the growth of sustainable initiatives in firms' activities and strategies, especially in the manufacturing industry. Sustainable performance is widely explored under the manufacturing management research in the areas of product development, supply chain management, lean manufacturing; and the supplier evaluation and selection. Previously, manufacturing competitive advantage relies on producing innovative products. However, new trends of the market embrace the development of eco-friendly product because of its contribution in lowering the environmental risk

The increasing attention and global competition in sustainability development has forced the local automakers and the suppliers to shift their paradigm in green production strategy and activities. The pressure towards the adoption of environmental innovation relies on the worsening air quality problem and the response on global trends to produce hybrid and electric vehicles particularly in Japan, China and India. Thus, the environmental sustainability came to forefront Malaysian government priorities since 2009 in the areas of energy, transport, building, and manufacturing.

Therefore, this research suggested four main factors namely technology collaboration, green human resource, eco culture and eco product innovation. The concept of eco product innovation refers to the initiative of the firms to voluntary effort adapting green technology towards sustainable development [2-3] Eco product innovation comprised of both aspects, the incremental and the radical innovation. The incremental eco product innovation related on the replacement of conventional materials with the recycles components, eco efficiency production and design for recyclable product. Meanwhile, radical eco product is much significant on replacement of critical components that resulted on high impact to environment, creation a valuable new product from recycle components or creation a new product that superior in technology and new to the market [4-5].

Second factors refer to technology collaboration which is measuring on both parties, the customer and the supplier relationship. In order to attain higher performance of environmental product; then, building a network with suppliers

and working on close integration with the customers are essential to improve product efficiency. It is because of explicit information for the environmental impact rooted in different forms of components and materials [6]. Furthermore, firms were advised to form a collaboration with the suppliers for exchanging the information either through the environmental programmes or through joint R&D for measuring environmental impact [7].

The Green human resource plays as a third factor in this research and it can be defined as a green training, performance base rewards and a cross functional team [8]. Human resource residing in the organisation must be properly developed and managed to encourage the information flow and circulation to gain benefits [9]. Lastly, eco culture must be adopted by firms in order to leverage business sustainability. In order to ensure success green implementation, new research must integrate hierarchical organisational cultures and departmental cultures [10-11].

III. RESEARCH METHODOLOGY

The ultimate aim for this research is to identify and to evaluate the antecedents of sustainable development. Fig. 1. showed the conceptual model for the sustainable development.

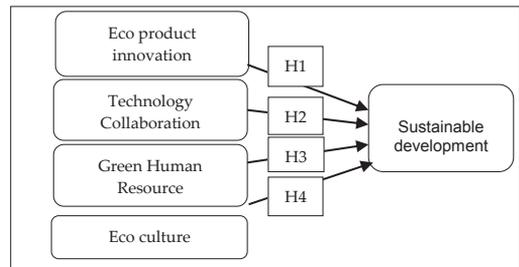


Fig. 1. Theoretical framework

Based on the aforementioned discussion, we hypothesize that:

H1: Eco product innovation will lead to positive relationship to sustainable development

H2: Technology collaboration will lead to positive relationship to sustainable development

H3: Green human resource has a positive relationship to sustainable development

H4: Eco culture has positive effect on sustainable development

This research utilized a quantitative methodology via survey (questionnaire) given to 300 respondents as an instrument of collecting data. The sample for this research consists of seven sub sectors in the Malaysian automobile industry. The 242 returned questionnaire were analyzed via Co variance-based SEM (CB-SEM). The key informants or respondents that answer the survey are those in the managerial levels from the Malaysian automotive industry that are involved actively in the waste reduction activities.

IV. RESULT AND DISCUSSION

The returned questionnaires were then grouped into small-medium and large corporation by referring to the standards of Department of Statistics Malaysia (2009). Regarding to the former standard, the frequency of respondents from the SME and large corporations were recorded by N = 120 (49.6%) and N = 122 (50.4%) respectively. There are various types of ownership status among the Malaysian manufacturers, especially for the automotive industry. The majority of the respondents were from established companies by more than 10 years (80.9%) and by either Malaysian fully owned or Joint Venture Corporation. Data analysis derived for both statistics proved that the data are free from missing data, outliers and multicollinearity. Also, data for the reliability (CR>0.7) and validity (AVE>0.5) is accepted as per requirement. Result for the hypothesis testing was describe in Table I.

TABLE I RESULT OF HYPOTHESIS TESTING

Predictor variable	Criterion variable	Estimate β	S.E.	C.R.	P	Results
Eco Product Innovation (H1)	Sustainable development	0.07	0.04	2.00	0.07*	Supported
Technology collaboration (H2)	Sustainable development	0.12	0.04	1.72	0.06*	Supported
Green human resource (H3)	Sustainable development	0.14	0.04	2.05	0.00**	Supported
Eco-culture(H4)	Sustainable development	0.07	0.04	1.67	0.08*	Supported

Overall, the questionnaires were randomly distributed across the small, medium (N < 200 employees) and large corporation (N > 200 employees) in the selected areas. According to the statistics, questionnaire distribution was from 120 and 122 of small medium and large organizations respectively. Moreover, each respondent has high reputation and excels in their business performance as the majority of organisation’s sales turnover is more than RM250, 000 million. The Malaysian automotive industry is steadily growing and has stimulated foreign direct investment from the United States of America, Europe, Japan, and others such as Taiwan and Singapore. Thus, this has resulted in various types of respondents in terms of ownership status and the length of operation.

A positive relationship revealed between technology collaboration level practices with sustainable development as in Hypotheses 2. The finding indicated that technology collaboration en route to sustainable development in terms of economy, ecology and social performance [12]. Also, the social performance gained by practising technology collaboration is important in improving compliance to environmental certification especially supplier commitment [13]. Having a strong collaboration with suppliers leads to knowledge transfer for both tacit and the explicit one that enables them improving the operation efficiency in terms of product quality and the cost of production [14]. This finding supported the previous literature which showed a strong linkage with customer can improve the process development and can increase the economic and the environmental performance [15-16]. Moreover, having a strong relationship with customers will helps to reduce the consumption of hazardous materials because customers are continuously support the suppliers by providing more information regarding the process of optimisation and the environmental ideas for green product. High linkages with customers per se also increased suppliers’ awareness towards environmental certification, because some customers act as a push factor to encourage environmental innovation activities [17].

Green human resources in terms of training and green team have a positive relationship with sustainable development. This finding shed light on the relationship between training with the development of product and the production process with smaller environmental impacts. Generally, training improved employees' actions to perform environmental actions in terms of introducing the substituted cleaner materials and changing production process. Environmental training to employees is important as it brings along new knowledge, skills, and awareness (SKA) towards environmental activities, and also improves employees behaviour and work commitment.

Green human resources embedded in green team formation have embraced a greater attention to support sustainability development. Having a green team in the organisation opens the doors for continuous improvement activities and motivating employees for a better operational and environmental performance especially in pollution prevention (P2), pollution control, and waste minimisation. On the other hand, rewards and incentives were not good enough predictors of sustainable development, because it is not easy to design a single compensation package that fits employee satisfaction. Rewards and recognition act as a bridge to encourage employee initiatives towards environmental performance, choosing the correct rewards is vital for the managers as positive rewards bring more benefits to the organisations rather than negative ones.

The positive relationship between eco-culture and sustainability development is captured in Hypotheses 4. Organisational culture acts as a firm's strategic weapon towards sustainable performance. Under the broad umbrella of eco-culture, top management support is considered as the heart of firm's initiatives to enhance employees' motivation and commitment towards reducing hazardous materials and improving operation performance. This research confirmed previous findings which indicated that human relation model are preferable for the Malaysian automotive industry as compared to "hierarchical cultures model" to encourage employee's environmental improvement activities.

Having a strong support from the top

management in terms of encouraging employees to express concern on organisation's environmental decisions and policies is vital, especially for the Malaysian automotive industry in order to increase operation effectiveness and reduction on the consumption of hazardous materials. Further, discussion of the previous mistakes is crucial so that the employees will not repeat similar mistakes in the future and it is important for them to learn from the past so that more innovative activities can be performed through TQM, lean management, 5 S and other quality improvement activities to support economical, ecological, and social performance. Apart from improving the process and product performance, inputs from all parts of the organisation are meaningful in order to achieve the sustainability development especially for upstream and downstream supply chain as increasing supplier's commitment towards environmental certification.

This study draws conclusion that eco-product innovation leads to a positive sustainability development as in Hypotheses 1. Eco-innovation particularly eco-product innovation [18] plays a significant role in this new millennium to drive sustainability development in triple bottom line such as ecology, economy, and social. However, the results differ from previous analysis that environmental protection practices only benefit in economics and environment through revenue increment (market segmentation, product differentiation, and exploiting pollution control technologies) and cost reduction (risk reduction, cost of materials, energy and services, cost of capital, and cost of labour).

Even though there are various findings in the literature, the report only gives a rudimentary indication in the state of eco-innovation study as the results of the study may differ because of the country setting. In particular, the Malaysian automotive industry perceives incremental eco-innovation in terms of simplifying new product components and using little energy of new products, updates manufacturing process, equipment, new technologies to reduce the environmental impact and save energy as well as implementing recycling system into the manufacturing process. The findings are closely linked with the [19] in the framework of green

product innovation as the Malaysian automotive industry embraces both energy and pollution focus during manufacturing and disposal stages during new product development activities. These results confirmed the previous literature as the Malaysian manufacturing industry excelled in the implementation eco-efficiency in terms of green or sustainable manufacturing [20], [11], green supply chain [21] and eco design [13], [22]. Such practices are also applicable in new product development; especially in auto parts as the environmental initiatives growth on improving the production efficiency since more training invests on quality improvement [23] rather than improving skilled workers in product design capabilities [24-25]. This resulted in the lack of capability building in eco-design among the Malaysian auto parts as well as increasing the dependency on the partnership to make both product and process design.

The empirical evidence is very fruitful in clarifying our understanding of benefits gained from eco-product innovation embedded in three types, namely ecology, economy, and social. As in ecology, the Malaysian auto firms are capable to reduce the consumption of hazardous materials. In another coin, for the economic performance, the Malaysia auto industry outshines in implementing operational effectiveness to improve product quality, reduce cost of operation as well as search alternate technologies and procedures. Meanwhile, at the heart of social performance, the Malaysian auto industry significantly improves supplier commitment on the environmental certification. To conclude, under the holistic management point of view, the Malaysian auto industry succeeds in the implementation of eco-product innovation that leads to sustainable development in economy, ecology and social performance.

V. CONCLUSION

In particular, to be success in sustainable development, organizations are recommended to maximize the implementation of technological collaboration, green human resource, eco culture and eco product innovation. In conclusion, the findings are critical for the manufacturing

industry mainly in the developing countries that are moving toward an environmental innovation implementation.

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